

SEARCHED BY
PATENT

- 5 -

Location Update timer value is currently indicated to the MS in the broadcast information (thus, all MS in same location area use the same value).

- 5 However, when a large number of additional communication units for M2M applications are introduced in the existing mobile communication network structures this will result in an increase in the signaling load for the networks.

10 SUMMARY OF THE INVENTION

It is an object of the present invention to provide an improved method of adjusting the mobility management in a mobile communication network, and to provide a
15 corresponding system and/or units which improve the mobility management adjustment in the mobile communication network.

This object is achieved, for example, by a method of
20 adjusting mobility management in a mobile communication network, said mobile communication network comprising a mobility control unit adapted to track location of communication units communicating in said mobile communication network and to control the mobility
25 management for said communication units, said method comprising the steps of providing said mobility control unit with mobility information related to a communication unit, evaluating the degree of mobility of said communication unit from said mobility information related
30 to said communication unit, and adjusting mobility management elements used for mobility management of said communication unit in said mobile communication network on the basis of said evaluated degree of mobility.

- 6 -

REPLACED BY
ART 32 AMDT

Furthermore, this object is achieved, for example, by a mobility control unit in a mobile communication network, said mobility control unit being adapted to track location of communication units communicating in said mobile communication network and to control the mobility management for said communication units, said mobility control unit comprising means adapted to receive mobility information related to a communication unit, means adapted to evaluate the degree of mobility of said communication unit from said mobility information related to said communication unit, and means adapted to adjust mobility management elements used for mobility management of said communication unit in said mobile communication network on the basis of said evaluated degree of mobility.

15 Additionally, this object is achieved, for example, by a communication unit used in connection with a mobile communication network, said mobile communication network comprising a mobility control unit adapted to track location of communication units communicating in said mobile communication network and to control the mobility management for said communication units, said communication unit is adapted to send mobility information related to said communication unit, said mobility information being usable by said mobility control unit to evaluate the degree of mobility of said communication unit, and to set management elements used for mobility management in said mobile communication network on the basis of predefined changed periodic update timer values and/or predefined changed mobility management parameters sent from said mobility control unit.

35 Furthermore this object is achieved, for example, by a mobility management adjustment system used in a mobile communication network, said mobility management adjustment

REPLACED BY
ART 34 ANDT

- 7 -

system comprises at least such a mobility control unit and a communication unit.

Advantageous further developments of the present invention
5 are as set out in the respective dependent claims.

Said mobility information related to said communication unit may include a specific information element indicating a periodic update timer value and/or predefined mobility management parameter for mobility management elements of said communication unit and/or said mobility control unit, said periodic update timer value and/or predefined mobility management parameter being detected in said evaluating step.

15 Furthermore, said mobility information related to said communication unit may include previous location information and current location information of said communication unit, said previous location information and current location information being compared in said 20 evaluating step to determine whether they are equal.

In the adjustment, said mobility management elements of said communication unit and/or said mobility control unit 25 may be set to predefined changed periodic update timer values and/or predefined changed mobility management parameters.

Furthermore a function of the mobile communication network, 30 which is used to force a modification of an operation state of the communication unit, may be disabled during the MM adjustment.

The communication unit may be employed in a static device 35 used for a M2M application, such as a vending machine. This

REPLACED BY
ART 34 ANDT

- 8 -

means that the communication unit represents an "immobile mobile station".

- The mobility control unit may be integrated in a core network control unit of the mobile communication network.
- 5 The present invention can be employed in different types of mobile communication networks, such as circuit switched or packet switched networks, 2nd or 3rd Generation communication networks (GSM, UMTS) and the like. Thus, the
- 10 core network control unit may be, for example, a mobile switching center (MSC) or a SGSN. However, also other network control elements controlling the MM can be employed.
- 15 The mobility management elements may be timer elements of said communication unit and said mobility control unit, e.g. ready timers, periodic routing area update (RAU) timers or periodic LU timer of said communication unit and/or said mobility control unit (e.g. core network
- 20 control unit).

The mobility information related to said communication unit may be provided from said communication unit. Furthermore, the mobility information related to said communication unit

25 may be provided from a core network control unit of the mobile communication network.

Said mobility information may include a request for setting at least one mobility management element to a maximum value

30 or a request for deactivating at least one mobility management element. Correspondingly, the mobility management elements may be set to maximum setable values and/or may be deactivated. Alternatively, the mobility management elements may be set to values which are

35 incremented by a predetermined amount in comparison to the values set before.

REPLACED BY
ART 34 AMDT

- 26 -

CLAIMS

1. Method of adjusting mobility management in a mobile communication network (3; 30; 330), said mobile communication network comprising
 - a mobility control unit (4; 40; 320) adapted to track location of communication units (1; 10; 310) communicating in said mobile communication network and to control the mobility management for said communication units,
 - said method comprising the steps of providing (S1) said mobility control unit with mobility information related to a communication unit,
 - evaluating (S2) the degree of mobility of said communication unit from said mobility information related to said communication unit, and
 - adjusting (S3) mobility management elements used for mobility management of said communication unit in said mobile communication network on the basis of said evaluated degree of mobility.
2. Method according to claim 1, wherein said mobility information related to said communication unit includes a specific information element indicating a periodic update timer value and/or predefined mobility management parameter for mobility management elements of said communication unit and/or said mobility control unit, said periodic update timer value and/or predefined mobility management parameter being detected in said evaluating step.
3. Method according to claim 1 or claim 2, wherein said mobility information related to said communication unit includes previous location information and current location information of said communication unit, said previous location information and current location information being compared in said evaluating step to determine whether they are equal.

REPLACED BY
PART 34/35/36/37

- 27 -

4. Method according to any of the preceding claims, wherein said adjusting step comprises a step of setting said mobility management elements of said communication unit and/or said mobility control unit to predefined changed periodic update timer values and/or predefined changed mobility management parameters.
5
5. Method according to any of the preceding claims, further comprising a step of disabling a function of the mobile communication network which is used to force a modification of an operation state of the communication unit.
10
6. Method according to any of the preceding claims, wherein said communication unit is employed in a static device used for a M2M application.
15
7. Method according to any of the preceding claims, wherein said mobility control unit is included in a core network control unit of the mobile communication network.
20
8. Method according to any of the preceding claims, wherein said mobility management elements are timer elements (15, 16, 45, 46) of said communication unit and said mobility control unit.
25
9. Method according to any of the preceding claims, wherein said mobility information related to said communication unit is provided from said communication unit.
30
10. Method according to any of the preceding claims, wherein said mobility information related to said communication unit is provided from a core network control unit of the mobile communication network.

REPLACED BY
ART 34 AND T

- 28 -

11. Method according to claim 9, wherein said mobility information includes a request for setting at least one mobility management element to a maximum value.

5 12. Method according to claim 9, wherein said mobility information includes a request for deactivating at least one mobility management element.

10 13. Method according to any of the preceding claims, wherein in said adjusting step the mobility management elements are set to maximum setable values.

15 14. Method according to any of the claims 1 to 12, wherein in said adjusting step the mobility management elements are deactivated.

20 15. Method according to any of the claims 1 to 12, wherein in said adjusting step the mobility management elements are set to values which are incremented by a predetermined amount in comparison to the values set before.

25 16. Mobility control unit (4; 40; 320) in a mobile communication network, said mobility control unit being adapted to track location of communication units (1; 10; 310) communicating in said mobile communication network and to control the mobility management for said communication units,

30 said mobility control unit comprising means adapted to receive mobility information related to a communication unit,

means adapted to evaluate the degree of mobility of said communication unit from said mobility information related to said communication unit, and

35 means adapted to adjust mobility management elements used for mobility management of said communication unit in

- 29 -

said mobile communication network on the basis of said evaluated degree of mobility.

17. Mobility control unit according to claim 16, wherein
5 said received mobility information related to said communication unit includes a specific information element indicating a periodic update timer value and/or predefined mobility management parameter for mobility management elements of said communication unit and/or said mobility control unit, wherein said means adapted to evaluate the degree of mobility of said communication unit detects said periodic update timer value and/or predefined mobility management parameter.
- 15 18. Mobility control unit according to any of claims 16 to 17, wherein said received mobility information related to said communication unit includes previous location information and current location information of said communication unit, wherein said means adapted to evaluate 20 the degree of mobility of said communication unit compares said previous location information and current location information to determine whether they are equal.
- 25 19. Mobility control unit according to any of claims 16 to 18, wherein said means adapted to adjust said mobility management elements sets said mobility management elements of said communication unit and/or said mobility control unit to predefined changed periodic update timer values and/or predefined changed mobility management parameters.
- 30 20. Mobility control unit according to any of claims 16 to 19, wherein said mobility control unit is further adapted to disable a function of the mobile communication network which is used to force a modification of an operation state 35 of the communication unit.

REPLACED BY
ART 34 ANDT

WO 03/063535

PCT/EP02/00598

- 30 -

21. Mobility control unit according to any of claims 16 to 20, wherein said communication unit is employed in a static device used for a M2M application.
- 5 22. Mobility control unit according to any of claims 16 to 21, wherein said mobility control unit is included in a core network control unit of the mobile communication network.
- 10 23. Mobility control unit according to any of claims 16 to 22, wherein said mobility management elements are timer elements (15, 16, 45, 46) of said communication unit and said mobility control unit.
- 15 24. Mobility control unit according to any of claims 16 to 23, wherein said mobility information related to said communication unit is received from said communication unit.
- 20 25. Mobility control unit according to any of claims 16 to 24, wherein said mobility information related to said communication unit is provided from a core network control unit of the mobile communication network.
- 25 26. Mobility control unit according to claim 24, wherein said mobility information includes a request for setting at least one mobility management element to a maximum value.
- 30 27. Mobility control unit according to claim 24, wherein said mobility information includes a request for deactivating at least one mobility management element.
- 35 28. Mobility control unit according to any of claims 16 to 27, wherein said means adapted to adjust the mobility management elements sets the mobility management elements to maximum setable values.

SEARCHED BY
ART 34 AMDT

- 31 -

29. Mobility control unit according to any of claims 16 to 27, wherein said means adapted to adjust the mobility management elements deactivates the mobility management elements.

10 30. Mobility control unit according to any of claims 16 to 27, wherein said means adapted to adjust the mobility management elements sets the mobility management elements to values which are incremented by a predetermined amount in comparison to the values set before.

15 31. Communication unit (1; 10) used in connection with a mobile communication network (3; 30), said mobile communication network comprising a mobility control unit (4; 40) adapted to track location of communication units communicating in said mobile communication network and to control the mobility management for said communication units,

20 said communication unit is adapted to send mobility information related to said communication unit, said mobility information being usable by said mobility control unit to evaluate the degree of mobility of said communication unit, and

25 to set management elements used for mobility management in said mobile communication network on the basis of predefined changed periodic update timer values and/or predefined changed mobility management parameters sent from said mobility control unit.

30 32. Communication unit according to claim 31, wherein said mobility information related to said communication unit includes a specific information element indicating a periodic update timer value and/or predefined mobility management parameter for mobility management elements of said communication unit and/or said mobility control unit.

RECEIVED
ART STAND

- 32 -

33. Communication unit according to any of claims 31 to 32, wherein said communication unit is employed in a static device used for a M2M application.

5

34. Communication unit according to any of claims 31 to 33, wherein said mobility management elements are timer elements (15, 16, 45, 46) of said communication unit.

10 35. Communication unit according to any of claims 31 to 34, wherein said mobility information includes a request for setting at least one mobility management element to a maximum value.

15 36. Communication unit according to any of claims 31 to 34, wherein said mobility information includes a request for deactivating at least one mobility management element.

20 37. Mobility management adjustment system used in a mobile communication network (3; 30; 330), said mobility management adjustment system comprises at least a mobility control unit (4; 40; 320) according to any of claims 16 to 30 and a communication unit (1).

25 38. Mobility management adjustment system according to claim 37, wherein said communication unit (1, 10) is one according to any of claims 31 to 36.

30

35